# CHIP CARRIER, AND METHOD OF TESTING A CHIP USING THE CHIP CARRIER

## Background of the Invention

### Field of the Invention

The present invention relates to a chip carrier that is used for a test burn-in, etc., for a chip such as a bare chip, as well as to a method of testing a chip using the chip carrier.

### Background Art

With the advancement of techniques of mounting a chip on a substrate and packaging techniques such as multi-chip packaging, the need for assuring the quality of a chip before its mounting or packaging is becoming increasingly high. This need is satisfied in such a manner that a chip is tested in a state that it is temporarily accommodated in a chip carrier and thereby the characteristics of the chip as well as whether the chip is good or defective are checked. In this manner, the reliability of a semiconductor device obtained by mounting or packaging the chip after the above testing is assured and the test yield of the semiconductor device is increased.

A conventional chip carrier will be described below with reference to Figs. 7 and 8.

Fig. 7 is a schematic perspective view of a conventional chip carrier. In Fig. 7, reference numeral 5 denotes a chip (bare chip) as cut out from a wafer; 10 denotes a carrier base for accommodating the chip 5; 11 denotes contacts to be electrically connected to the chip 5; 13 denotes a carrier cover; and 14 denotes a carrier cover lock. Having a hinge mechanism, each of the carrier cover 13 and the carrier cover lock 14 is joined to the carrier base 10 rotatably.

To test the chip 5 using the chip carrier having the above structure, first, the chip 5 is mounted on the contacts 11. Then, the carrier cover 13 is rotated and thereby fitted into the carrier base 10 so as to cover the chip 5 from above. Further, the carrier cover lock 14 is rotated and thereby fitted into or engaged with the carrier base 10 and the carrier cover 13. In this manner, the carrier cover 13 is prohibited from rotation.

The chip carrier thus assembled is mounted in a testing apparatus or the like and subjected to prescribed tests. The chip 5 that has been tested is removed from the chip carrier and another chip 5 is mounted in the chip carrier.

Fig. 8 is a schematic perspective view showing how another conventional chip carrier disclosed in Japanese Patent Laid-Open No. 1996-75819 is assembled. In Fig. 8, reference numeral 3 denotes contacts; 5 denotes a chip; 15 denotes a carrier base; 18 denotes a carrier cover; and 19 denotes carrier cover locks. The carrier cover 18 has, on both sides, step portions into which the carrier cover locks 19 are to be fitted.

In the chip carrier thus configured, first, the chip 5 is mounted on the contacts 3 in the direction indicated by an arrow in Fig. 8. Then, the carrier cover 18 is mounted so as to cover the top surface of the chip 5. Further, the carrier cover locks 19 are engaged with the respective step portions of the carrier cover 18 that are provided on both sides. As a result, the carrier cover 18 is fixed to the carrier base 15.

In the conventional chip carrier shown in Fig. 7 in which each of the carrier cover 13 and the carrier cover lock 14 has the hinge mechanism, to make the sliding portions of the hinge mechanisms sufficiently durable, in many cases the related members are made of a metal or the like. The carrier base 10 is required to have at least spaces for accommodating the hinge

mechanisms. As such, this conventional chip carrier has problems that the number of parts is large, the manufacturing cost is high, and it is hard to miniaturize because of the complex structure.

Further, since the shape of the chip carrier is much different from that of an actual packaged semiconductor device, it is difficult to share conventional testing equipment for semiconductor devices; this necessitates introduction of testing equipment dedicated to this chip carrier. Not only does investment in such equipment add to the costs of semiconductor devices but also tests are made inefficient.

In contrast, the conventional chip carrier shown in Fig. 8 has an advantage that it can easily be miniaturized because of the relatively simple structure. However, the chip carrier is difficult to assemble for the following reasons. The carrier cover locks 19 which are to be engaged with the carrier cover 18 from both sides to fix the carrier cover 18 are independent, relatively small parts that are separate from the carrier cover 18 and the carrier base 15. The attachment/detachment direction of the carrier cover locks 19 is different from that of the chip 5 and the carrier cover 18. Further, the mouths of the carrier cover locks 19 need to be expanded in attaching them to the carrier cover 18.

Therefore, if it is attempted to automate the insertion/detachment of the chip 5 to/from the chip carrier, a problem arises that a resulting automatic apparatus will necessarily be complex.

**Summary of the Invention**

The present invention has been made to solve the above problems in the art, and an object of the invention is therefore to provide a chip carrier that is composed of only a small number